

2013 BMP Implementation Survey

Mississippi's BMP Implementation Monitoring Program

The Best Management Practices Implementation Monitoring Program was developed to provide a way to measure the voluntary use of BMPs in Mississippi. The Mississippi Forestry Commission conducts the BMP Implementation Survey on a three-year cycle.

Mississippi's Voluntary Silvicultural Best Management Practices Implementation Monitoring Program

2013 BMP Implementation Survey For Mississippi



Prepared by Mississippi Forestry Commission

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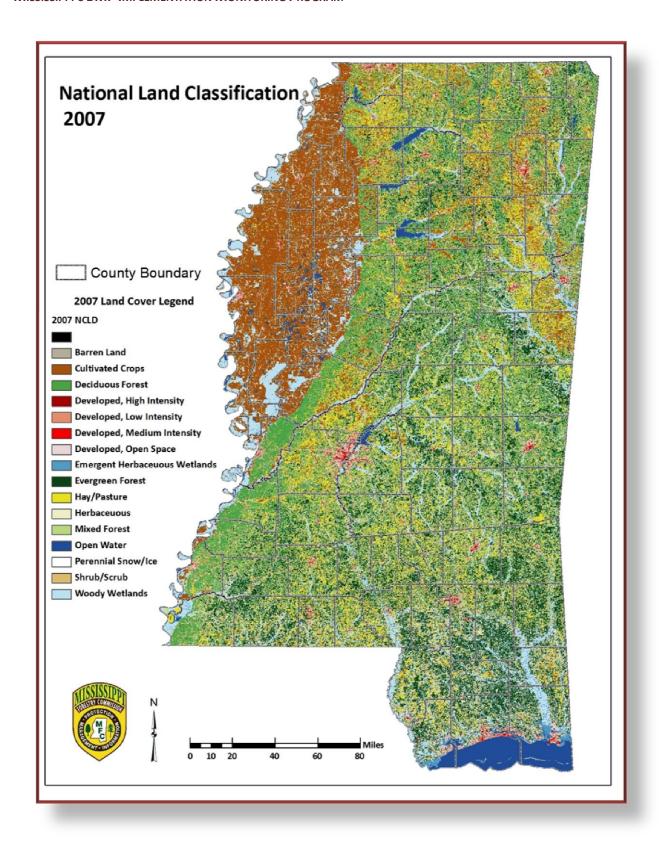


Figure 1: Forest Cover Types in Mississippi

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Executive Summary

In 2013, the Mississippi Forestry Commission conducted a field survey of best management practices (BMPs) voluntarily implemented on forestland in Mississippi. This report presents the results of that survey.

The guidelines set forth in "Silvicultural Best Management Practices Implementation Monitoring: A Framework for State Forestry Agencies" was used to develop the 2013 BMP Implementation Survey for Mississippi.

A total of 254 sites in 71 counties located in 9 basins in Mississippi having recent silvicultural activity were randomly selected to evaluate the voluntary implementation of best management practices. The Mississippi Forestry Commission utilized its own personnel to conduct the survey.

The following criteria were applied in selecting sites to be included in the survey:

- Forest harvesting activities occurring within 24 months.
- Sites must be at least 10 acres in size.
- Sites were selected without regard to ownership.

The 2013 BMP Implementation Survey results for Mississippi revealed that 95 percent of best management practices applicable to the survey sites were implemented in accordance with the guidelines published in the handbook *Mississippi's BMP – Best Management Practices for Forestry in Mississippi*. Figure 2 shows the BMP categories evaluated during the survey and the implementation results for each category.

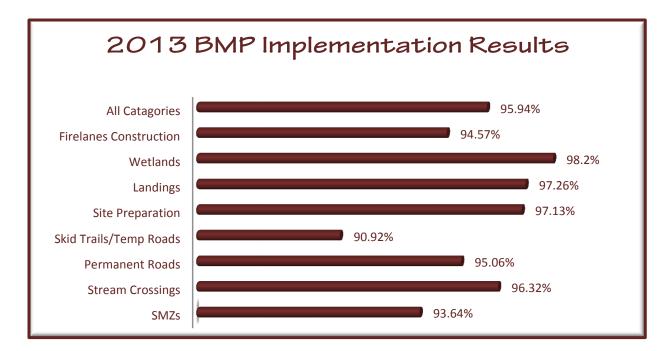


Figure 2: 2013 BMP Implementation Results

Introduction

Mississippi has nearly 20 million acres of forestland, covering two-thirds of the state's total land area. Forests make an important contribution to Mississippian's quality of life by providing jobs, forest products, livestock forage areas, wildlife habitat, scenic areas, recreational experiences, clean air, clean water, and many other social, economic, and health benefits.

The Clean Water Act of 1987 required that proper steps be taken to prevent water pollution. Mississippi's Silvicultural Best Management Practices (BMPs) were established as a result of the Clean Water Act of 1987. Best Management Practices are non-regulated, voluntary guidelines for silvicultural activities that, when properly applied will protect water quality from non-point source pollutants while maintaining site productivity. Non-point source pollution is defined in Section 319 of the Clean Water Act of 1987 as "pollution caused by diffuse sources that are not regulated as point sources and normally associated with agricultural, silvicultural [emphasis added], urban runoff, and runoff from Figure 3: Chunky River in Newton County, Mississippi construction activities, etc. Such pollution results in



human-made or human-induced alteration of the chemical, physical, biological, and radiological integrity of the water."

The Best Management Practices Implementation Monitoring Program was developed to provide a way to measure the voluntary use of BMPs in Mississippi. The program began in 1988 when the Department of Environmental Quality requested that the Mississippi Forestry Commission coordinate the development of voluntary best management practices for forestry in Mississippi. The Mississippi Forestry Commission worked with the Mississippi Forestry Association to put together a group of individuals representing a cross section of the forestry community to develop the guidelines. This group included landowners, loggers, forest industry, professional foresters, and the Department of Environmental Quality. Suggestions and comments from other states were also considered in the development of Mississippi's silvicultural BMPs.

The BMP guidelines were approved by the Mississippi Department of Environmental Quality and the Environmental Protection Agency and in 1989, published in the handbook Mississippi's BMPs - Best Management Practices for Forestry in Mississippi. The handbook was revised in 1995, 2000 and 2008.

2013 BMP Implementation Survey Procedure

Sampling Method

The 2013 BMP Implementation Survey is a statewide survey designed to assess statewide BMP compliance and not individual basin BMP compliance. Therefore, all results contained in this report are statewide results only.

The survey design from the Statistical Guidebook for BMP Implementation Monitoring produced by the Southern Group of State Foresters was used to determine the number of sample sites to visit. Based on an estimated overall percentage of implementation from past surveys, the sample size needed would have been 144 sites. However, we felt that a sample size of 250 should be used in order to adequately represent forestry activity statewide.

Mississippi Automated Resource Information System (MARIS) was used to determine how many harvest sites per county met the survey criteria. MARIS used spatial analysis of imagery taken roughly 2 years apart to map these harvest sites. Once those sites were determined, a count of harvest sites per county was derived. The 250 site sample size was then divided among the counties based on the percentage of sites found in each county. A final sum of 254 sites, an increase due to rounding of percentages, were then randomly located within the individual counties using random plot allocation software. Those random sites that didn't fall on a site were then moved to the nearest site. Alternate sites were also randomly allocated to replace any sites that were harvested due to urban expansion, de-forestation, adverse landowner or any other reason the site did not qualify.

Eligible Survey Sites

Site selection criteria used for the 2013 survey were: (1) sites must have had some type of forest harvesting activity, either regeneration harvest or thinning, within a period of two years prior to the survey, (2) sites must be at least 10 acres in size, and (3) sites were selected without regard to ownership. The ownership of a site was determined after the site had been selected. This allowed for an unbiased selection and distribution of survey sites in regard to ownership.

Survey Site Evaluation

For each site surveyed by a Commission forester, 73 values were collected on each of the 8 BMP categories. The BMP categories are as follows:

- Streamside Management Zone (SMZ)
- Stream Crossings
- Permanent Roads
- Skid Trails/Temporary (Secondary) roads
- Site Preparation Activities
- Landings
- Wetlands
- Fireline Construction

If a value within a category did not apply to the survey site, it was recorded as Not Applicable (N/A). All other practices were considered applicable to the site and were evaluated on whether or not they were implemented as specified in Mississippi's BMP handbook. This method of evaluation allowed each BMP

category and, ultimately, the overall BMP implementation program, to be evaluated and the results expressed as a percent of applicable BMPs implemented.

The presence of a significant risk to water quality was noted for each best management practice evaluated. The forester evaluating the site used the following standard to determine the presence of a significant risk to water quality: Significant risk to water quality exists, if during a normal rainfall, sediment is likely to be delivered to a permanent water body. The presence of a significant risk did not mean that water quality was impaired on the site.

All information recorded for each BMP was based on observations made at the time of the inspection. The evaluation process did not include any assumptions concerning future activities on the site.

2013 BMP Implementation Survey Results

The 2013 BMP Implementation Survey revealed that 95.94 percent of best management practices applicable to the survey were implemented.

A total of 254 sites having recent silvicultural activity were randomly selected to evaluate the voluntary implementation of best management practices. A compilation of all survey data collected is found on the BMP Monitoring Inspection Form – State Totals (see pages 12-14).

General Tract Information

Silvicultural Activity

A regeneration harvest had occurred on 168 sites (66.14%) of the 254 sites surveyed. The remaining 33.85 percent of the sites involved thinning operations. Of the sites that had received a regeneration harvest, 91 had been artificially regenerated.

Tract Summary

The sites ranged in size from 10 acres to over 161 acres.

Figure 4 shows the distribution of survey sites by tract size.

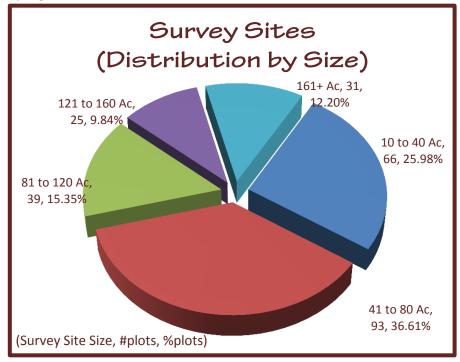


Figure 4: Distribution of survey sites by tract size

Ownership Summary

The survey sites were distributed and selected without regard to ownership in order to ensure an unbiased sample. Ownership was determined after a site was located. Figure 5 shows the distribution of survey sites in regard to ownership classes.

The 254 survey sites were in the following four forest ownership groups:

```
Private Nonindustrial —

(182 survey sites, 71.65 percent of survey)

State/Public —

(12 Survey sites, 4.72 percent of survey)

Federal —

(0 survey sites, 0 percent of survey)

Forest Industry —

(60 survey sites, 23.62 percent of survey)
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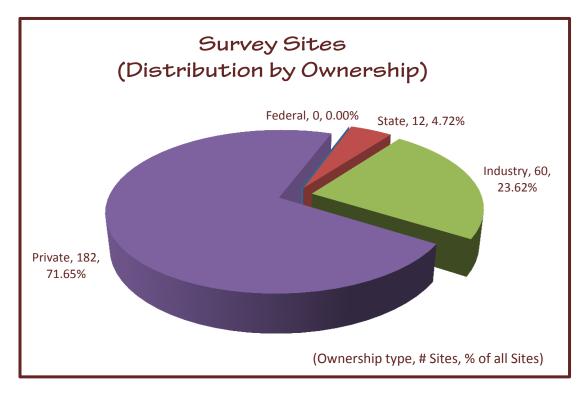


Figure 5: Survey Sites - Distribution by ownership

Counties

The BMP survey sites were randomly distributed across the state based on the potential need for BMPs. Survey sites were located in 71 of the 82 Mississippi counties. See Table 2 BMP Survey Sites by County, page 15.

River Basins

For each site inspected for BMP monitoring, the river basin containing the site was identified. Survey sites were located in 9 of Mississippi's 11 river basins as delineated in the Mississippi Department of Environmental Quality's Basin Management Program. No survey sites were located in the Upper Mississippi River Basin and the Tennessee River Basin. The river basins of Mississippi are shown below in Figure 6.

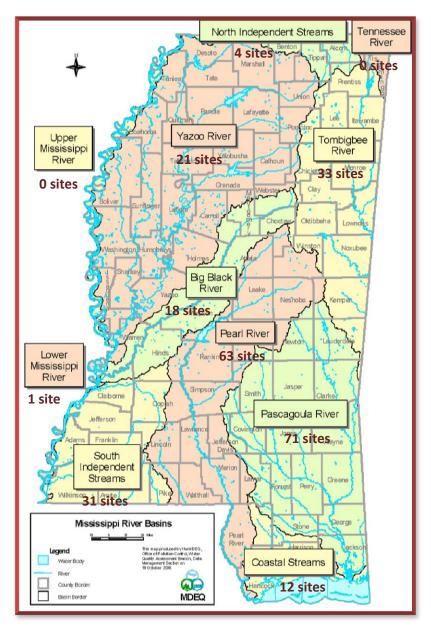


Figure 6: Mississippi River Basins

Survey Sites with Applicable BMPs by Categories

The number of survey sites on which BMP categories were applicable is shown in Figure 7. (This information is also found in Table 3, page 16)

The BMP categories Landings, Skid Trails/Temp Roads and Permanent Roads were applicable on more survey sites than other categories. The Landings and Skid Trails/Temporary Road categories were applicable on 254 (100.00%) of the 254 sites. The Permanent Roads on 235 (92.51%) of the survey sites.

The Streamside Management Zones category was applicable on 154 (60.63%) of the 254 sites survey while Steam Crossing applied on 136 (53.54%) sites.

The three remaining categories (Site Preparation, Wetlands and Fireline Construction) applied less frequently than any of the preceding categories. Site Preparation applied on 109 (42.91%) of the 254 survey sites, Wetlands applied on 57 (22.44%) and Fireline Constructions on 60 (23.62%) sites.

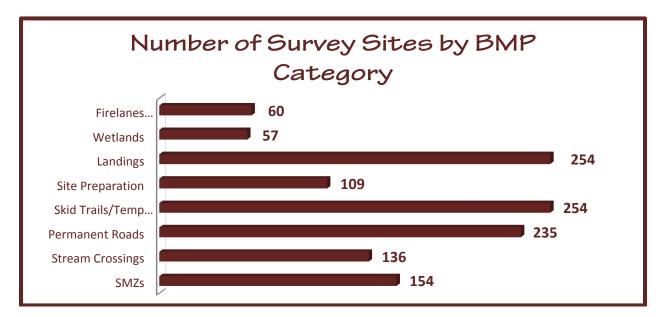


Figure 7: Number of Survey Sites for each BMP category

BMP Implementation

Applicable BMPs were evaluated on whether or not they were implemented as specified in the Mississippi's BMP handbook. Results showed that ninety-five percent of best management practices were implemented on survey sites where they were applicable (see Table 3, page 16).

Implementation results were also evaluated by BMP category. Figure 8 shows the implementation results for each BMP category. The number and percent of all applicable BMPs implemented for each category is presented in Table 3, page 16.

The lowest percentage of BMPs implemented was found in Skid Trails/Temporary Road category with 90.77% of the 1,224 applicable practices implemented as specified. Of the 2,476 practices in the Permanent Roads category, 94.87% were implemented as specified and 97.26% of the 1,239 practices in the Landing category were implemented as specified.

The Streamside Management Zones category had 93.45% of the 1,480 applicable practices implemented as specified and the Stream Crossings category had 96.00% of the 600 applicable practices implemented as specified.

Applicable BMP practices in the Site Preparation category had the third highest percentage implemented as specified with 97.02% of the 838 applicable practices implemented according to specifications. Of the 167 applicable practices in the Wetlands category, 98.20% were implemented and 93.80% of the 371 practices in the Fireline Construction were implemented as specified.

For a listing of 2013 BMP Implementation Results by MFC District, see page 17 in the Appendix.

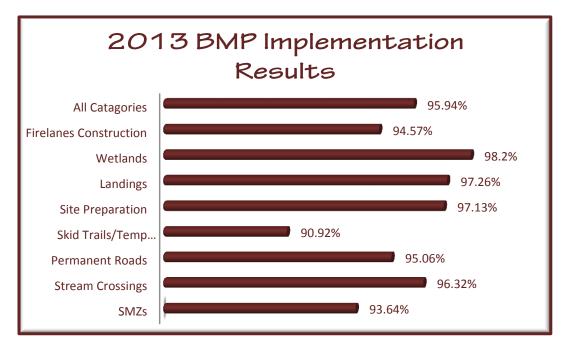


Figure 8: 2013 BMP Implementation Results

Significant Risk to Water Quality

Sites were evaluated for a significant risk to water quality each time a best management practice was determined to be applicable to the survey site. Of the 8,395 applicable BMPs evaluated, a significant risk to water quality was observed 16 times. These occurred on 16 of the 254 site surveyed. A complete listing of significant risks by individual best management practice is found on the BMP Monitoring Inspection Form – State Totals (see pages 12-14). A summary of significant risk by BMP category is given on Table 4, page 16.

No significant risks to water quality were observed in relations to BMPs associated with Landings and Wetlands. One significant risk was observed in relations to BMPs associated with Site Prep. Two significant risks were observed in the Stream Crossing and Skid Trails/Temporary Road categories. Three significant risks were associated with the Streamside Management Zone, and Fireline Construction BMP categories.

The highest significant risk to water quality, with five risks was observed in the Permanent Road. The majority of these risks were associated with the *potential problem soils avoided* with two risks.

Comparison of 2003, 2007, 2010 & 2013 Survey

The 2013 survey results exceed all previous survey results in all categories except for SMZs in 2010. Skid Trails/Temporary Roads remain the category with the lowest evaluation in all surveys. The category with the highest improvement was Skid Trails/Temporary Roads. It improved by 6 percent over the 2010 survey and 5 percent over the 2007 survey. Figure 9 shows comparison between the all BMP surveys since 2003.

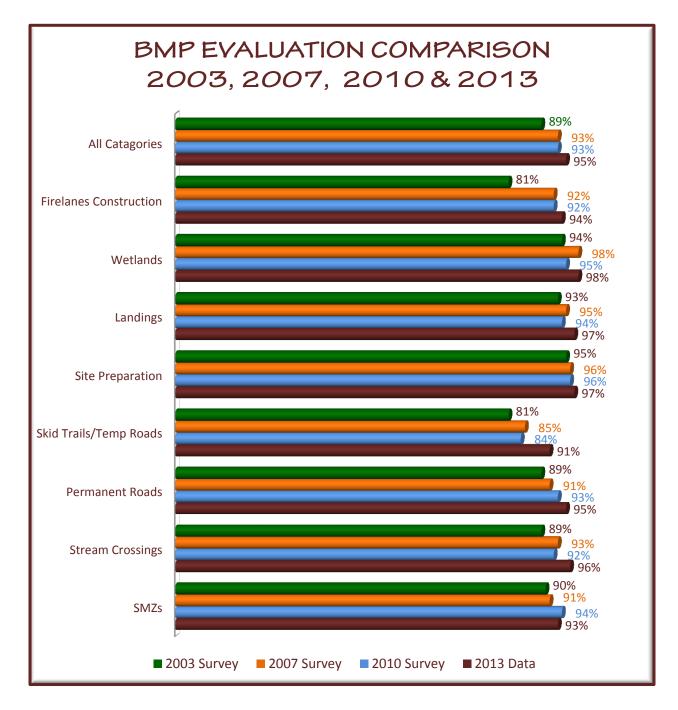


Figure 9: BMP Evaluation Comparison For All Surveys Since 2003.

Conclusion

Our forests play an essential role in the protection of water quality. They absorb rainfall, filter pollutants and recharge underground water supplies. Forests produce much of the clean water we need for recreation and support of fish and wildlife habitats as well as the drinking water supply for millions of Americans.

Despite the tremendous contribution our forest and forestry make to water quality, forestry activities have the potential to adversely impact our water locally. Voluntary best management practices are utilized in Mississippi to address this potential and help ensure water quality is protected. Studies have shown that BMP efforts work when applied in a landowner's property. The Mississippi Forestry Commission's 2013 BMP's Implementation Survey for Mississippi was conducted to assess the implementation of the voluntary BMPs in the state.

It is essential that the forestry community continue its efforts to protect water quality and monitor protection efforts. The Mississippi Forestry Commission, Southern Group of State Foresters and National Association of State Foresters are committed to the protection of our forests and water and to the routine assessment of protection measures implemented by the forestry community.



BEST MANAGEMENT PRACTICES FOR FORESTRY IN MISSISSIPPI

Appendix



Table 1: BMP Monitoring Inspection Form - State Totals

1.	General Tract Informati Silvicultural Activity:		on Cut <u>168</u>			Thin	ning	<u>86</u>				
	Estimated Tract Size:	10 - 40	<u>66</u> 41 - 8	30 <u>93</u>	81 -	- 120	<u>39</u>	121 -	- 160	<u>25</u>	161 or more	<u>31</u>
	Ownership Group:	PNIF <u>182</u>		State	e <u>12</u>			Federal	<u>0</u>		Industry	<u>60</u>
	Mississippi River Basin:	Lower Miss North Inde	reams Basin sissippi Rivei pendent Stre a River Basir	ams Basii	18 12 1 1 1 63		T T U	outh Indepennessee ombigbee ombigbee lazoo Rive	River E River E issippi	Basin Basin River Ba		31 0 33 0 21
2.	Site Characteristics Estimate Slopes Percent	: 0% - 5%	% <u>120</u>	6% - 20%	6 <u>101</u>		21	% - 40%	<u>27</u>	C	Over 40%	<u>5</u>
	Predominant Soil Texture	,	_	ay Loam ty Soil	<u>74</u> <u>18</u>	Lo	am	<u>19</u>	Sand	dy Loam	<u>120</u>	
	Erodibility Hazards:	Low	<u>99</u> Me	edium	<u>136</u>	Hi	gh	<u>18</u>				
	Type of Stream Present:		ial Stream eral Stream	<u>61</u> <u>53</u>		In N/		ttent Strea	ım <u>77</u> 63	_		
	Estimate Distance to Nea	arest Perma 300 or		, ,	: 800	<u>39</u>		801 – 16	00 <u>3</u>	<u> 3</u>	1601 or Mo	ore <u>71</u>
	Evidence of Spills or Fue	ls on Site:	Yes <u>6</u>	N	lo <u>24</u>	<u>8</u>						
	Trash, Oil Cans, Hoses of	or Other Con	tainers Left (On Site:	Yes	<u>5</u>		No 2	<u> 249</u>			
	Has Tract Been Regener	ated artificia	ılly? Ye	es <u>91</u>		No	<u>77</u>	N/A	<u>86</u>			
3.	Streamside Managemer SMZ width established as Harvesting/thinning within SMZ integrity honored (n Stream course clear of los SMZ free of roads and la Streams free of sediment Rutting through streams Prescribed burning avoid Blocking the natural flow Stream bank integrity honored	ccording to I in SMZ acco o chem., fer ogging debris ndings t due to silvi or drains av led of water avo	rding to BMF t, burning, lo s cultural activ oided	g decks, e	stc.) Section % Com		Is	103 110 102 103 103 104 104 123 104 104 104	12 13 14 14 14 12 12 14	34 26 39 41	No 16 17 12 10 10 7 4 4 7 7 94	Sig. Risk 1 1 0 0 0 0 0 0 0 3

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			A1/A	v		0: 0: 1
4.	Steam Crossings		N/A	Yes	No	Sig. Risk
	Ditches that dump in streams avoided		120	124	9	1
	Stream crossings properly installed		138	109	6	1
	Number of stream crossings minimized		134	120	0	0
	Stream or drain crossing installed at right angle only		136	116	2	0
	Stream crossing stabilized during use	O (' T . (.)	142	107	5	0
		Section Totals	00.00	576	22	2
-		% Compliance	96.32	V	M.	Oin Dial
5.	Permanent Roads		N/A	Yes	No	Sig. Risk
	Roads respect sensitive areas	f:ft f 1	33	221	0	0
	Rutting depth does not exceed six inches for more than	ппу теет	20	222	12	0
	Roads located where side drainage can be achieved		20	225	8	1
	Roads wide enough to achieve surface drying		20	231	3	0
	Roads reshaped and/or stabilized		22	203	28	1
	Roads meet grade specifications		23	217	13	1
	Roads are well drained with appropriate structures		49	189	16	0
	Side ditches do not dump into streams		40	203	11	0
	Flat no grade roads avoided		24	211	19	0
	Streambeds, rocky places and steep slopes avoided		41	206	7	0
	Potential problem soils avoided	O (' T . (.)	26	221	5	2
		Section Totals	05.00	2,349	122	5
•		% Compliance	<u>95.06</u>	V	NI.	0: 0:1
6	Skid Trails/Temporary (secondary) Roads		N/A	Yes	No	Sig. Risk
	Sensitive area respected		11	241	2	0
	Majority of skid trails grades (steepness) below 15%	,	2	247	5	0
	Rutting does not exceed six inches for more than fifty fe		0	244	10	0
	Water bars, turnouts, and other water control structures	present	32	161	60	1
	Roads and skid trails are stabilized	0 " T / /	1	218	34	1
		Section Totals	20.00	1,111	111	2
_		% Compliance	90.92	V	NI.	01. 01.1
7.	Site Preparation		N/A	Yes	No	Sig. Risk
	Sensitive area respected		154	100	0	0
	Contour followed		168	85	1	0
	SMZ integrity honored (no chem., fert, burning, log decl	KS, etc.)	167	79	7	1
	Soil disturbance kept to a minimum		150	101	2	0
	Excessive soil compaction avoided	ah al an a a	149	103	2	0
	Does it appear that chemicals were used according to k	abei spec	165	87	2	0
	Disturbance on slopes minimized		154	96	4	0
	Water diverted from site preparation area to vegetated s	surtace	164	84	6	0
	Extremely hot burns avoided	O	176	78	0	0
		Section Totals	07.40	<u>813</u>	<u>24</u>	<u>1</u>
0		% Compliance	<u>97.13</u>	V	M.	Oin Dial
8.	Landings		N/A	Yes	No	Sig. Risk
	Location outside of SMZ		21	231	2	0
	Well-drained location		0	250	4	0
	Number and size minimized		0	251	3	0
	Sensitive areas respected		10	243	1	0
	Restored stabilized	Cootia - Total	0	230	24	0
		Section Totals	07.00	<u>1,205</u>	<u>34</u>	<u>0</u>
		% Compliance	<u>97.26</u>			

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9.	Wetlands	N/A	Yes	No	Sig. Risk
	Hydrology of site unaltered	198	<u>56</u>	0	<u>0</u>
	Roads, drainage structures applied properly	199	<u>54</u>	<u>*</u> 1	
	Mandatory BMP's followed	198	<u>54</u>	0 1 2 3	<u>0</u> <u>0</u> <u>0</u>
	Section To		<u>164</u>	3	0
	% Complia	nce 98.20	<u></u>	<u>~</u>	<u>~</u>
10.	Fireline Construction	N/A	Yes	No	Sig. Risk
	Firebreak erosion controlled	197	55	1	1
	Majority of fireline constructed around slopes or grades of less that 10%	-	53	2	1
	Water bars, turnouts, and other water control structures properly installed	196	48	9	1
	Diversion ditches not constructed at head of a drain	198	54	2	0
	Firelines not constructed down the slope of natural gully	200	52	2	0
	SMZs left between the fireline and stream	209	42	3	0
	Avoid constructing firelines into an SMZ	209	44	1	0
	Section To	tals	348	20	<u>3</u>
	% Complia	nce <u>94.57</u>		_	_
11.	Follow Up Questions	N/A	Yes	No	
	Was activity supervised by professional forester?	124	105	8	
	Was landowner familiar with BMP Handbook?	125	99	13	
	Was logger familiar with BMPs?	98	133	5	
	Were BMPs included in contract?	140	91	5	
	Has logger completed Logger Educational Training course?	127	104	5	
	Are recommendations planned for landowner, if needed?	137	63	36	
	Section To	tals	<u>595</u>	<u>72</u>	
	% Complia	nce <u>89.21</u>			

State Compliance % 95.94

Table 2: BMP 2013 Monitoring Sites by County

County	Survey Sites	County	Survey Sites	County	Survey Sites
Adams	1	Itawamba	4	Pike	5
Alcorn	2	Jackson	4	Pontotoc	2
Amite	11	Jasper	8	Prentiss	2
Attala	4	Jefferson	5	Quitman	0
Benton	1	Jefferson Davis	3	Rankin	5
Bolivar	0	Jones	6	Scott	3
Calhoun	4	Kemper	5	Sharkey	0
Carroll	2	Lafayette	3	Simpson	6
Chickasaw	3	Lamar	3	Smith	5
Choctaw	2	Lauderdale	6	Stone	3
Claiborne	2	Lawrence	3	Sunflower	0
Clarke	7	Leake	5	Tallahatchie	1
Clay	2	Lee	1	Tate	1
Coahoma	0	Leflore	0	Tippah	1
Copiah	7	Lincoln	4	Tishomingo	1
Covington	4	Lowndes	1	Tunica	0
DeSoto	0	Madison	2	Union	1
Forrest	4	Marion	5	Walthall	4
Franklin	7	Marshall	2	Warren	1
George	4	Monroe	5	Washington	0
Greene	4	Montgomery	2	Wayne	7
Grenada	1	Neshoba	5	Webster	2
Hancock	5	Newton	6	Wilkinson	2
Harrison	5	Noxubee	3	Winston	6
Hinds	4	Oktibbeha	3	Yalobusha	2
Holmes	3	Panola	1	Yazoo	3
Humphreys	0	Pearl River	3		
Issaquena	0	Perry	4	Total Plots	254

Table 3: Applicable BMPs Implemented By Category

BMP Category	Number of	Total Applicable	BMPs Implemented		
	Survey Sites	Practices	Number	Percent	
Streamside Management Zones	154	1,480	1,383	93.45	
Stream Crossing	136	600	576	96.00	
Permanent Roads	235	2,476	2,349	94.87	
Skid Trails/Temporary Roads	254	1,224	1,111	90.77	
Site Preparation	109	838	813	97.02	
Landings	254	1,239	1,205	97.26	
Wetlands	57	167	164	98.20	
Fireline Construction	60	371	348	93.80	
State Totals		8,395	7,949	95.17	

Table 4: BMP Categories with Significant Risks to Water Quality

BMP Category	Number	Percent
Streamside Management Zones	3	18.75%
Stream Crossing	2	12.50%
Permanent Roads	5	31.25%
Skid Trails/Temporary Roads	2	12.50%
Site Preparation	1	6.25%
Landings	0	0.00%
Wetlands	0	0.00%
Fireline Construction	3	18.75%
State Totals	16	100.00%

Table 5: 2013 BMP Evaluations By Categories For Each MFC District

BMP Category	Capital	ECD	NED	NWD	SCD	SED	SWD
Firelane Construction	95	99	92	75	86	100	100
Wetlands	100	95	100	100	97	100	100
Landings	94	99	98	93	97	97	98
Site Preparation	88	98	100	93	98	100	96
Skid Trails/Temp Roads	84	96	89	82	94	94	90
Permanent Roads	95	92	98	91	93	96	96
Stream Crossings	93	95	100	97	93	100	98
All Categories	92	96	96	89	94	98	97

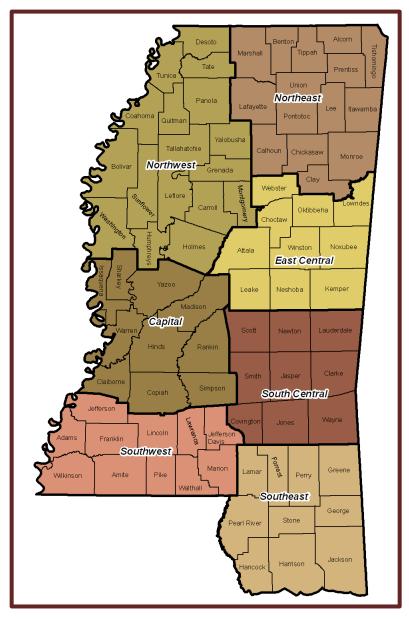


Figure 10: Map of MFC Districts





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